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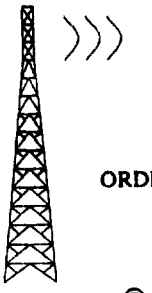

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August 25, 1994

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: COMMENTS OF GRAND BROADCASTING CORPORATION IN CC. Doc. No. 94-54, FCC 94-145

Dear Mr. Caton:

Please find enclosed an original and seven copies of the above referenced COMMENTS. Please return a file stamped copy in the enclosed self addressed, postage prepaid envelope. Should you have any questions do not hesitate to contact the undersigned at the below specified address or telephone number.

Respectfully submitted,

David A. Reams

David A. Reams
President and General Counsel
Grand Broadcasting Corporation
P.O. Box 502
Perrysburg, Ohio 43552
419/666-8112

cc: w/enc.

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Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

Equal Access Obligations of Commercial Mobile Radio Service Providers; Interconnection Obligations of Local Exchange Carriers to Commercial Mobile Radio Service Providers; Interconnection Obligations of Commercial Mobile Radio Service Providers	)	CC Doc. No. 94-54 FCC 94-145

Notice of Proposed Rule Making; Notice of Inquiry

COMMENTS OF GRAND BROADCASTING CORPORATION

To: The Commission

David A. Reams
President and General Counsel
Grand Broadcasting Corporation
P.O. Box 502
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TABLE OF CONTENTS

ATTACHMENTS

Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

Equal Access Obligations of Commercial Mobile Radio Service Providers; Interconnection Obligations of Local Exchange Carriers to Commercial Mobile Radio Service Providers; Interconnection Obligations of Commercial Mobile Radio Service Providers	)	CC Doc. No. 94-54 FCC 94-145

Notice of Proposed Rule Making; Notice of Inquiry

COMMENTS OF GRAND BROADCASTING CORPORATION

To: The Commission

Grand Broadcasting Corporation, hereinafter termed "Grand Broadcasting", by counsel and pursuant to the Commission's Notice of Proposed Rule Making ("NPRM/NOI") in the above captioned matter, hereby files Comments in response to the NPRM/NOI. These Comments address the issues raised in the NOI portion of the NPRM/NOI concerning

> "... whether the Commission should require CMRS providers to furnish interconnection to ... [and] ... physical connections with other [mobile service] carriers ... [and] the nature and scope of [such] interconnection obligations" (59 FR 35665)

with respect to Grand Broadcasting's proposed INTERACTIVE BROADCAST RADIO SERVICE/MOBILE ELECTRONIC MAILBOX SERVICE*, hereinafter termed "IBRS/MEMS".

* Grand Broadcasting filed with the Commission a PETITION FOR RULEMAKING AND REQUEST FOR PIONEER'S PREFERENCE to establish an INTERACTIVE BROADCAST RADIO SERVICE ("IBRS"), hereinafter termed "Petition", which is pending in both GEN. Doc. Nos. 90-314 and 91-2. At page 4 of a STATUS REPORT ON IBRS DEVELOPMENT filed in said dockets on August 27, 1993 Grand Broadcasting requested, if deemed appropriate, "an expanded service concept including IBRS such as mobile electronic mailbox service".

I. SUMMARY

In this Rule Making and Notice of Inquiry proceeding the Commission is seeking to provide a level playing field for competing mobile service providers. Specifically, with respect to the Notice of Inquiry portion of this proceeding, the Commission is attempting to create an equal or fair competitive environment by requiring CMRS carriers to provide competing mobile service providers with access and interconnection to CMRS networks and facilities which will enable such competitors to effectively compete in respective markets.

Effective competition in IBRS/MEMS markets demands that the proposed two competing Part 95 licensees

1) are able to provide integrated data/voice service offerings and

2) are able to achieve the same infrastructure-based network/operational efficiencies.

RBOC/GTE and interexchange carrier cellular radio licensees are likely to value the proposed IBRS/MEMS service most highly, especially for its CMRS/PMRS flexibility and its digital mobile electronic mail features which at 900 MHz could be most efficiently "piggy backed" on such licensees' respective existing cellular radio networks. Consequently, such cellular radio licensees are likely to be the highest bidders at auction and obtain IBRS/MEMS licenses in their respective cellular radio

markets.

Certain cellular radio network access and interconnection rights are requested herein so that the IBRS/MEMS mobile service provider which will compete with said respective cellular radio operator-IBRS/MEMS licensees, e.g. Grand Broadcasting pursuant to its pioneers preference request, is able to provide the same integrated data/voice service offerings with "piggy backed" network/operational efficiencies such cellular radio operator-IBRS/MEMS licensees will provide. Even if an RBOC/GTE or interexchange carrier cellular radio operator does not obtain an IBRS/MEMS license in a market in which it has a cellular radio system the same requested cellular network access and interconnection rights should be afforded for analogous competitive reasons.

Grand Broadcasting in its requested nationwide pioneers preference request for IBRS/MEMS proposes an optimally efficient network/operational design in which narrowband digital data service is "piggy backed" on digital cellular radio voice service and both said data and voice services are accessible to consumers via a single cellular radio-RDPU handset device. To assure a vibrant, competitive environment in the proposed IBRS/MEMS marketplace the competing IBRS/MEMS licensees must be entitled to achieve the same "piggy backed" data/voice service and network/operational efficiencies as that

planned in Grand Broadcasting's nationwide system.

II. BOTH IBRS/MEMS LICENSEES IN EACH MARKET AREA MUST RECEIVE EQUAL CELLULAR RADIO NETWORK ACCESS AND INTERCONNECTION TERMS AND CONDITIONS TO BE ABLE TO COMPETE EQUALLY IN INTEGRATED DATA/VOICE SERVICE AND NETWORK/OPERATIONAL EFFICIENCIES.

1. IBRS/MEMS IS OPTIMALLY DESIGNED TO "PIGGY BACK" NARROWBAND DATA SERVICE ON DIGITAL CELLULAR RADIO VOICE SERVICE INTEGRATED VIA A SINGLE CELLULAR RADIO-RDPU HANDSET.

IBRS/MEMS is optimally designed

> "to 'piggy back' on top of the existing cellular radio infrastructure to maximize network and operational efficiencies."

SEE COMMENTS OF GRAND BROADCASTING CORPORATION in GEN. Doc. No. 94-33, FCC 94-101 at p.2. As stated in said COMMENTS in GEN. Doc. No. 94-33, FCC 94-101 IBRS/MEMS should have the flexibility to be classified as either PMRS or CMRS depending on the type of long distance carrier operated electronic mail network interconnected to, e.g. PMRS for restricted X.400 based electronic mail network interconnection or CMRS for non-restricted/non-X.400 based electronic mail network interconnection. Clearly, in this NPRM/NOI the Commission should order that, at least when a mobile service is licensed to provide both PMRS and CMRS, CMRS providers not be allowed to arbitrarily provide the PMRS inferior interconnection than that provided the CMRS.

The above referenced integrated IBRS/MEMS-cellular radio system design "further maximizes network and

operational efficiencies by having the cellular radio service provider upon whose facilities IBRS/MEMS is 'piggy backed' provide the non-IBRS/MEMS voice service described in the Petition." SEE COMMENTS OF GRAND BROADCASTING CORPORATION in GEN. Doc. No. 94-33, FCC 94-101 at p.2 and ET Doc. No. 93-266 at p.4, note. The proposed narrowband data ("buy/inquiry") communications service "piggy backed" on said voice communications service will thereby provide consumers with dual IBRS/MEMS data and non-IBRS/MEMS voice capabilities.*

To achieve the compelling spectrum efficiencies and synergies attainable via said "piggy back" design IBRS/MEMS must be allocated radio frequency in the 900 MHz band as requested, inter alia, in the Petition "because said frequency is extremely close to the existing cellular radio frequency band thereby making any cost of re-engineering base station radio receivers to also receive [IBRS/MEMS] radio frequency (900 MHz) data/control transmission minimal, if not negligible ... [and] consumer RDPU devices ... could be designed into ... cellular radio handsets

* Efficient spectrum management clearly demands a narrowband allocation for IBRS/MEMS:

> "[t]he efficiencies inherent in transmitting short data bursts for IBRS ('buy/inquiry') transactions via narrowband, e.g. 500 kHz, rather than wideband, e.g. cellular, radio frequency are well-known to those skilled in the art."

SEE COMMENTS OF GRAND BROADCASTING CORPORATION in ET Doc. No. 93-266 at p. 5.

...". SEE COMMENTS OF GRAND BROADCASTING CORPORATION in GEN. Doc. No. 93-252 at p.6.* Indeed, the National Association of Broadcasters envisions AM/FM radio receivers being built into cellular radio handsets for sophisticated broadcast radio/data applications which, in a mobile environment, are included in the definition of IBRS/MEMS. SEE attached hereto RADIO/PC Prospect Excites NAB Board, R. Sukow, Radio World, July 13, 1994, p. 1, 3.**

A 900 MHz IBRS/MEMS allocation will quickly enable the NAB to realize such vision by facilitating the "piggy back" design referenced above and described more fully in Grand Broadcasting's COMMENTS filed in GEN. Doc. No. 93-252, which are incorporated herein by reference. Specifically,

* Due to such compelling spectrum efficiencies, said 900 MHz allocation is clearly much more spectrum efficient than the IVDS 200 MHz allocation encompassed in the Petition. Indeed, the mobile IVDS allocation contemplated in RM 8476 lacks the service scope and efficiencies, spectrum use synergisms and PMRS/CMRS electronic mail flexibility inherent in 900 MHz IBRS/MEMS as contemplated in GEN. Doc. No. 90-314. Further, unlike the IVDS marketplace which appears handicapped from the start (SEE appended article "Uncertainty Abounds for Airwave Entrepreneurs", E. L. Andrews, NEW YORK TIMES, August 17, 1994, p. C1, C4), allocating IBRS/MEMS licenses utilizing readily adaptable 900 MHz equipment with the cellular radio network access and interconnection described herein will rapidly foster vibrant new service and equipment markets.

** In addition to the FM subcarrier data broadcast system referenced in said Radio World article Grand Broadcasting plans to deploy the embedded method of broadcasting data described and claimed in a still pending patent application and filed as experimental test results in GEN. Doc. No. 90-314 by Grand Broadcasting. SEE Initial Tone Broadcast Study appended to a letter dated March 23, 1993 filed in GEN. Doc. No. 90-314.

the Commission should promptly authorize and re-allocate for IBRS/MEMS the 1 MHz of 900 MHz radio frequency already allocated but not yet channelized for narrowband PCS in GEN. Doc. No. 90-314.*

A. CELLULAR RADIO CMRS LICENSEES ARE LIKELY TO BE THE HIGHEST BIDDERS FOR AND OBTAIN IBRS/MEMS LICENSES IN THEIR RESPECTIVE CELLULAR RADIO MARKETS.

The below specified cellular radio network equal access and interconnection requirements will be vital for competitive system development in markets where an RBOC/GTE or interexchange carrier cellular radio licensee is also a competing IBRS/MEMS licensee. MEMS will offer an extremely efficient and attractive alternative to cellular radio for sending and receiving electronic mail, particularly "piggy backed" on the emerging digital cellular radio infrastructure. Further, in contrast to cellular radio under existing rules, IBRS/MEMS as proposed by Grand Broadcasting will have the flexibility to be either PMRS or CMRS. Consequently, RBOC/GTE or interexchange carrier cellular licensees are likely to value and bid the highest for IBRS/MEMS licenses. Indeed, in the Commission's words

* With the abundance of paging radio frequency previously authorized by the Commission and the increasingly efficient, ubiquitous FM radio subcarrier band (RBDS) utility for paging applications, channelizing and licensing 2 out of the allocated 3 MHz of 900 MHz radio frequency for narrowband PCS advanced paging type services (providing an additional 10 nationwide and 2,000 regional/local paging spectrum licensees) should surely be more than enough radio spectrum to meet the paging industry's emerging needs for advanced paging services.

explaining competitive bidding with respect to IVDS licensees, such cellular radio licensees will "value [IBRS/MEMS licenses] most highly" and have the "ability to introduce valuable new [IBRS/MEMS] services and to deploy them quickly, intensively, and efficiently", thereby increasing the value of the license to such licensees. 59 FR 24948.*

i. CELLULAR RADIO OPERATOR IBRS/MEMS LICENSEES WILL UNDOUBTEDLY BUILD 900 MHZ IBRS/MEMS SYSTEMS "PIGGY BACKED" ON THEIR RESPECTIVE CELLULAR RADIO NETWORKS AND FACILITIES.

ii. TO EFFECTIVELY COMPETE WITH A CELLULAR RADIO OPERATOR'S "PIGGY BACKED" IBRS/MEMS SYSTEM THE OTHER IBRS/MEMS LICENSEE IN EACH MARKET AREA MUST BE ENTITLED TO RECEIVE CELLULAR RADIO NETWORK/FACILITY ACCESS AND INTERCONNECTION ON EQUAL "PIGGY BACKED" TERMS AND CONDITIONS.

Since RBOC/GTE or interexchange carrier cellular radio operator-IBRS/MEMS licensees will undoubtedly develop the optimal "piggy back" network/operational system design referenced above, respective competing IBRS/MEMS licensees

* For the good cause discussed in Grand Broadcasting's COMMENTS in ET Doc. No. 93-266 Grand Broadcasting should receive a nationwide pioneers preference license at no bid or other cost. Indeed, a bid or other payment requirement imposed now when the still pending Continuation-in-Part (CIP) patent application described in said COMMENTS was filed in reasonable reliance on the Commission's then-existing policy and rules granting a pioneers preference radio frequency license at no bid or other cost introduces significant uncertainty into whether Grand Broadcasting will be able to efficiently practice the invention applied for by obtaining and utilizing the required narrowband radio frequency, thereby frustrating the clear intent of Congress in legislating (35 USC Section 120) CIP patent application procedure and rights.

should be entitled to receive from the other cellular radio operator in the market (which would then provide the non-IBRS/MEMS voice service as noted) cellular radio network access and interconnection to achieve equivalent "piggy backed" network/operational efficiencies. Specifically, said competing IBRS/MEMS licensees (and both IBRS/MEMS licensees in each market area if a cellular radio licensee in the same market is not also an IBRS/MEMS licensee) should be provided equal access to and interconnection with at least the following cellular radio network facilities:

> "1) access and interface by RDPU [or equivalent] transceivers to transmit/receive on the radio frequency allocated for [IBRS/MEMS] to/from existing cellular radio base station transceivers;
> 2) access to base station facilities, i.e. antenna, radio receiver and transmitter, data and control signalling, processing equipment, power amplifiers and cell site controller (to extent not practical to install separately), back-up power equipment and other essential basic network control and management facilities that could be efficiently shared with [IBRS/MEMS] licensees and/or would be inefficient to install separately; and
> 3) access to and shared use of the existing cellular radio system MTSO, including X.25 links to LEC or interexchange carrier public data networks,

e.g. links cellular radio carriers are currently developing with Cellular Digital Packet Data Networks and also said links to X.400 EDI networks such as AT&T EASYLINK and other EDI public VANS."

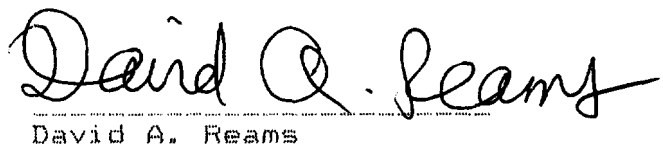
SEE COMMENTS OF GRAND BROADCASTING CORPORATION in GEN. Doc. No. 93-252 at p. 7.

B. EVEN IF A CELLULAR RADIO NETWORK OPERATOR IS NOT ALSO AN IBRS/MEMS LICENSEE IN A GIVEN MARKET, EQUAL CELLULAR RADIO NETWORK ACCESS AND INTERCONNECTION RIGHTS MUST STILL BE AFFORDED TO EACH IBRS/MEMS LICENSEE BECAUSE GRAND BROADCASTING CORPORATION'S PROPOSED PIONEERS PREFERENCE IBRS/MEMS SYSTEM INCORPORATES "PIGGY BACK" DATA/VOICE SERVICE AND NETWORK/OPERATIONAL EFFICIENCIES WHICH SUCH COMPETING IBRS/MEMS LICENSEES WILL NEED TO EFFECTIVELY COMPETE WITH GRAND BROADCASTING'S IBRS/MEMS SYSTEM.

Even if an RBOC/GTE or interexchange carrier cellular radio licensee does not obtain an IBRS/MEMS license in the same market(s) in which it has a cellular radio license(s), the above specified "piggy back" cellular radio network access and interconnection rights must still be afforded to IBRS/MEMS licensees for analogous competitive reasons. Grand Broadcasting in its requested nationwide pioneers preference request for IBRS/MEMS proposes the described optimally efficient network/operational design in which narrowband digital data service is "piggy backed" on digital cellular radio voice service and both said data and voice services are accessible to consumers via a single cellular radio/RDPU handset device. To assure a vibrant,

competitive environment in the proposed IBRS/MEMS marketplace the competing IBRS/MEMS licensees must be entitled to achieve the same "piggy backed" data/voice service and network/operational efficiencies as that planned in Grand Broadcasting's nationwide system.

Respectfully submitted,



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Radio World®

Vol 18, No 14 Radio's Best Read Newspaper

Radio/PC Prospect Excites NAB Board

by Randy Sukow

WASHINGTON A group of prominent broadcasters has begun promoting the idea of integrating AM/FM radio receivers with personal computers and other high-tech communications devices.

The National Association of Broadcasters' Radio Futures Committee, led by Richard Ferguson, president and chief executive officer, New City Communications, Bridgeport, Conn., proposed the initiative last month during a meeting of NAB radio board (see **RW** editorial, June 29).

The board approved the Future Committee's plan to establish a subgroup charged with approaching electronics companies with radio/high-tech convergence ideas.

Ferguson credits Alan Box, president, EZ Communications, Fairfax, Va., as the prime mover behind the strategy.

"I've just had this notion for the last six months now that there is a huge opportunity for the industry if we can get receivers in PCs, fax machines and perhaps even cellular telephones," Box told **RW**. "We could not only deliver our entertainment services, but do point-to-multipoint data distribution through RBDS (Radio Broadcast Data Service)."

Box said the plan gelled in his mind during the NAB Futures Summit in Carlsbad, Calif., last January, as representatives from Microsoft described plans for future TV/computer products. "It hit me like a bolt of lighting, 'Where is the radio?'" he said.

Pursuing agreement

Since that meeting, EZ Communications has been talking to Microsoft on its own about possible radio/computer applications, but Box said he could not provide more detail on those talks due to a nondisclosure agreement with MicroSoft.

Futures Committee members have also been discussing potential consumer and business applications among themselves in recent months and plan to continue gathering more ideas in the immediate future.

"If local area networks in offices were able to receive radio stations, the radio station could pump radio down through its subcarrier signals," Ferguson said.

"If Domino's Pizza wants to send out 10,000 faxes for the lunch hour special,

continued on page 3 ▶

Stern's Cleveland F
Briefly Silenced by

by Alan Haber

CLEVELAND It may have started out as just another funeral for his competition, but Howard Stern's June 10th on-air, ritual "burial" of WMMS-FM's Morning Zoo and WMJI-FM's morning man John Lanigan in Cleveland may turn out to be as memorable for the alleged sabotage that accompanied the event as much as the event itself.

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attempts to disrupt the Stern broadcast in other ways, including trying to arrange for a parachute jump at the broadcast site, and flying a helicopter over the crowd, which was chased away by a Cleveland Police helicopter.

As the dust settled June 14 on Stern's Cleveland appearance, Tiburski said "the hype that we hoped to get was the hype that we created, specifically to bringing Howard to town and giving a professional stage show. The improper and illegal activities of jamming our signal by somebody... and... the cutting of the wire... that's, you know, regrettable, and... that's a sideshow."

Tiburski also told **RW** that a granite tombstone, inscribed with Stern's name, was delivered by courier on the day of the Stern broadcast to WNCX from WMMS and WMJI.

Tiburski said he was not amused. "I mean, you know what I tell all these people? 'Why don't you all grow up?'"

Doug Podell, WNCX's program director, thinks that WMMS wasn't "prepared to go up against (Stern)... and, you know, I don't think they should have. I mean, if it would have been reversed... I'd have stayed away, let the guy come in, do his thing, and it would have been over."

Stern, for his part, barrelled his way through the broadcast in typical fashion. When all was said and done, Stern thanked everyone on the air for making his show number one in Cleveland.

Before leaving the air, he added that the other stations can try to pull the plug on his show and try every dirty trick in the book, but they can't replace talent.

Combining PC and Radio

▶ continued from page 1

why couldn't that be done on FM?" Box asked.

Perhaps the most exciting aspect, both Ferguson and Box said, is radio's mobility. Any application designed for home PCs or fax machines could be integrated into portable radios, laptop computers, car audio systems, cellular phones and future personal communications service receivers.

At press time, the organization and aims for the new NAB radio/computer project were still unsettled, but the potential technical problems and regulatory barriers to radio/computer development are expected to be key issues.

"If there are challenges and hurdles, as there undoubtedly will be, we can address those," Ferguson said. "There may need to be some standard setting or there may be some sort of research needed to help develop the systems, but my sense is that private industry can do all that."

There is a sense of urgency about the project. Ferguson has already appointed Box to chair the radio/computer subgroup and was planning early meetings with him to discuss the subgroup's next step. "There is nothing scheduled immediately, but the intention would be to move on with it," Box said.

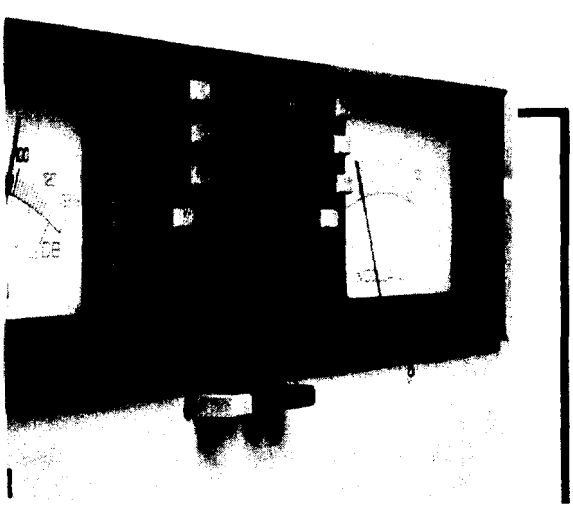
Futures Committee will also redouble efforts to encourage standards for high-speed FM data transmission services and, ultimately, in-band, on-channel digital audio broadcasting (DAB).

The completion of new digital audio and data transmission standards could be key to the ultimate success of radio/computer convergence. "If this is great in RBDS, it's even better in DAB," said Box, who is also chairman of NAB's digital audio broadcasting task force.

"People should not be taking a ho-hum attitude. We should move as fast as possible," Ferguson said. "Having said that, it is also true that there is only so fast you can go."

A DAB standard appears to be at least a year away. The Electronics Industries Association (EIA) and the National Radio Systems Committee (NRSC) are in the midst of laboratory testing of proposed DAB systems at NASA's Lewis Research Center in Cleveland. The tests were originally expected to extend into the fall, but have fallen slightly behind schedule, Box said.

DAB tapes recorded in Cleveland will be sent for subjective assessment at the Canadian Research Center (CRC) in Ottawa starting this fall. EIA and NRSC also plan field tests of the proposed systems following the lab tests.



Uncertainty Abounds for Airwave Entrepreneurs

By EDMUND L. ANDREWS

As the owner of the Continental Windshield Repair Company in Baton Rouge, La., Marilyn U. Moore would hardly seem qualified to become a communications entrepreneur. But that didn't stop her from bidding a hefty $600,000 recently for a handful of licenses to provide interactive television service over the airwaves.

"I believe that interactive television is the wave of the future," said Ms. Moore, who along with hundreds of other people packed into a Washington hotel ballroom three weeks ago and took an entrepreneurial leap of faith that if the Government was holding an auction then there must be something valuable for sale.

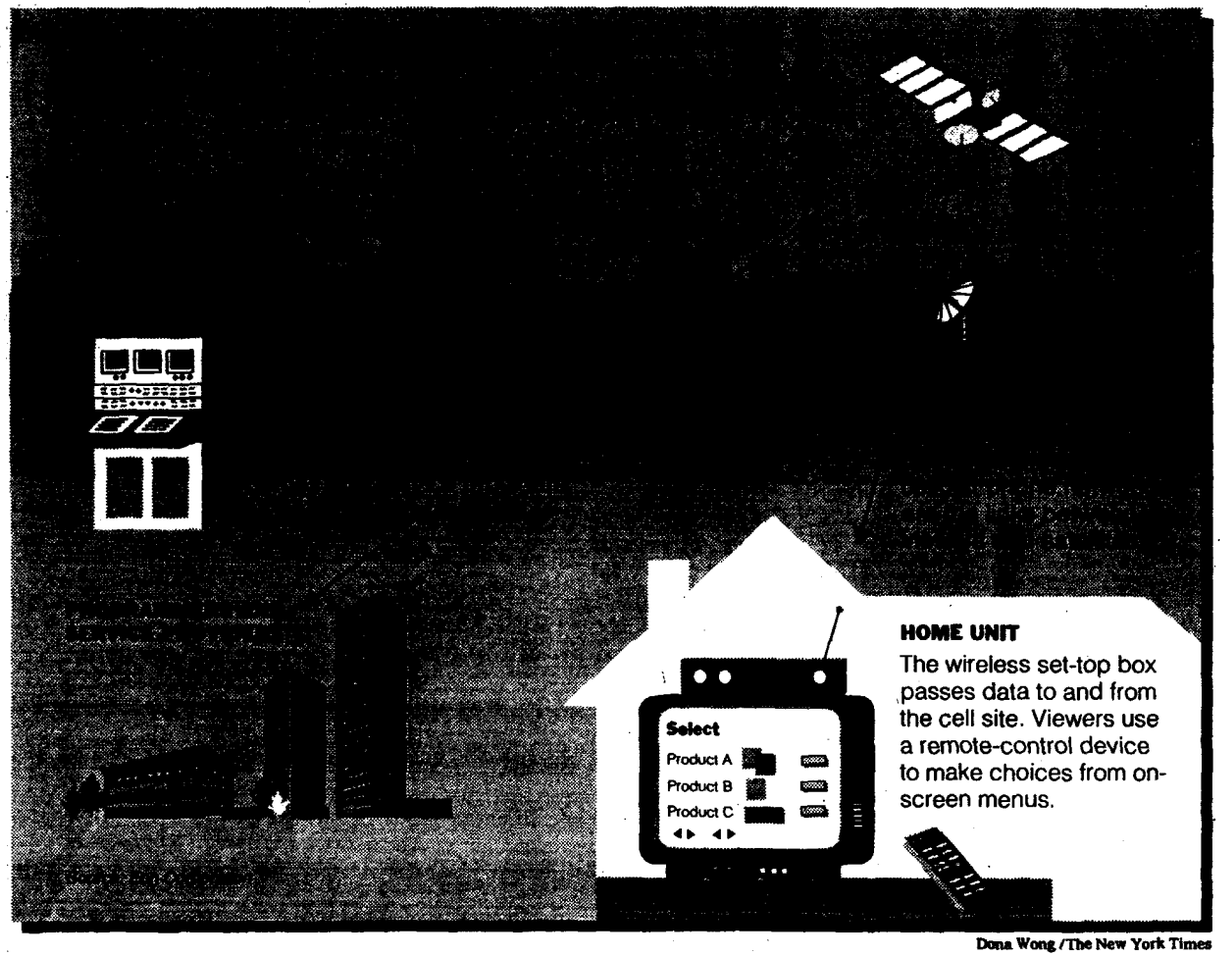
"Of course," added Ms. Moore, who won the licenses on behalf of herself and a small pool of investors, "it could ultimately turn out to be a pig in a poke."

'Absolutely No Guarantees'

Ms. Moore has met the deadline for the 10 percent down payment on her licenses. But uncertainties abound in the wake of the Federal Communications Commission's recent auction of some 300 interactive television licenses, which many bidders apparently saw as a way to grab a stretch of the information superhighway.

The F.C.C. said yesterday that 17 percent of the winners had defaulted on the down payments [Page C4]. Those in default, who will lose their application fees and may have to pay penalities, include the two biggest auction winners, who have said there are too many unanswered questions about what the service is supposed to be and when the necessary equipment will be ready.

Even the F.C.C., which surprised itself and the communications industry by attracting a total of $215 million in bids from the airwave auction, does not know how — or whether — the technology will actually work. And although airwave auctions are brand new, the commission's attitude from the start seems to be: let the buyer beware.



Dona Wong /The New York Times

"If you want to build the information highway through private investment, you have to let private investors make the decisions," said Reed E. Hundt, chairman of the F.C.C. "We provide opportunities, we don't provide guarantees. There are absolutely no guarantees."

The F.C.C. has set aside a narrow band of radio-wave frequencies adjacent to channel 13 on the television broadcasting spectrum. Using these frequencies is supposed to enable television programmers and their viewers to communicate back and forth via a small device attached to a television set.

In reserving the frequencies, the F.C.C. explicitly refused to endorse any particular technology or any particular business model for making money from such a system. Television broadcasters themselves seemed to have generally shunned the auction, leaving the bidding to companies that would operate the wireless networks as a service to sell to the broadcasters, their programmers, advertisers and viewers.

"The commission did not allocate spectrum for any specific technology

Continued on Page C4

Airwave Investors Wondering

Continued From First Business Page

or any particular vendor or firm," said Robert Pepper, head of the F.C.C.'s office of plans and policy. "The commission has been very clear about exactly what the status of the technology is and that there are competing approaches."

At least two companies, the Eon Corporation of Reston, Va., and Radio Telecom and Technology of Riverside, Calif., have developed network technology for such systems. And though the two technologies are incompatible so far, each takes a similar approach.

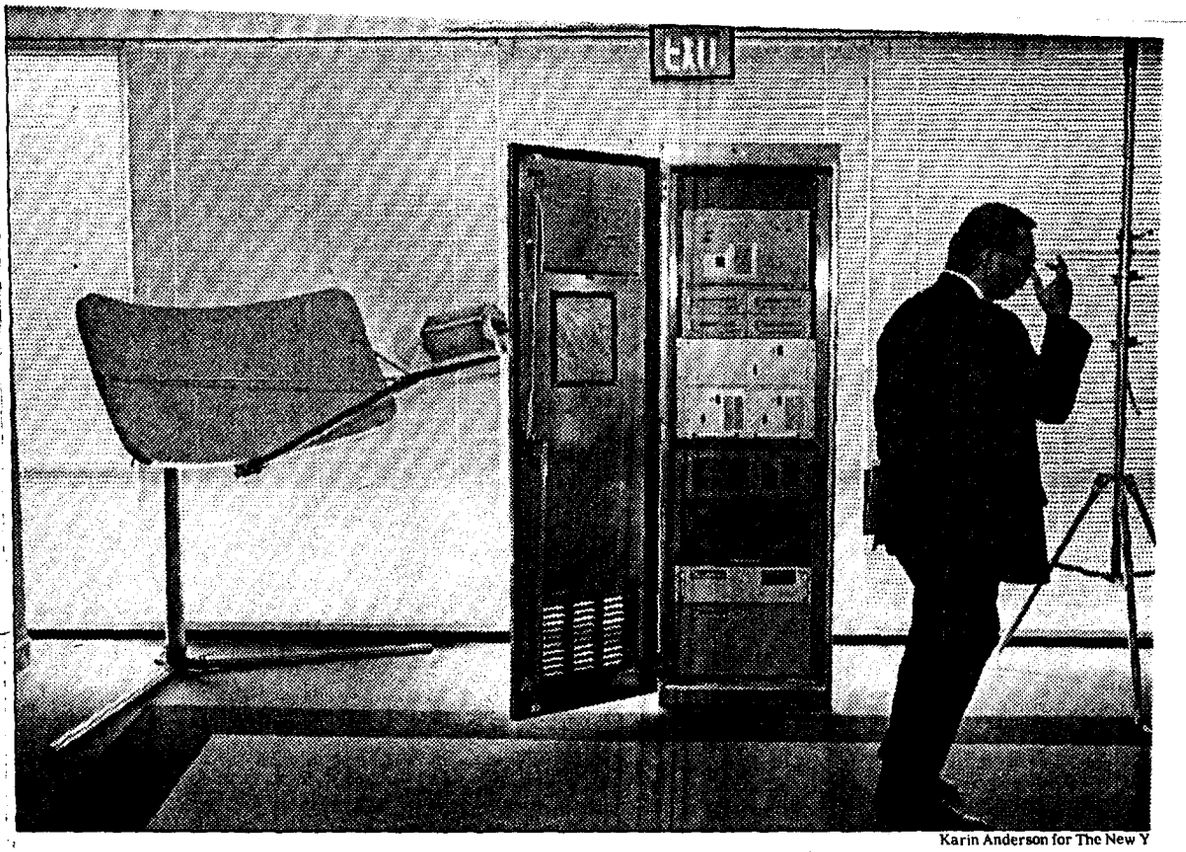
The set-top device would display a list of possible activities on the screen, like the option to order a product being advertised or to compete with other viewers of a televised football game by guessing whether the next play will be a pass or a run. Another possibility would be letting viewers take part in an instant poll during a television talk show.

By clicking a remote control device, the viewer could choose an on-screen option and the signal would be transmitted by radio waves to a control center in the city where the viewer lives. From there, the instruction might be sent by satellite or by telephone lines to a transaction-processing center. If a person was buying a product, the order would be routed to the merchant. In the case of games and contests, the signals would be relayed to the programmer.

Difficulties Getting Started

Assuming that either of the new technologies works, however, there are still many uncertainties. Eon, for example, estimates that its type of network would cost about $2 a household to build — about $3 million in a big city like Washington. But success depends on solving a chicken-and-egg problem: television viewers won't buy the new set-top devices for their homes unless they are attracted by a wealth of interactive programming. And advertisers and television producers are unlikely to roll out new shows or interactive advertisements unless millions of people have installed the boxes.

Moreover, even as the F.C.C. sells entrepreneurs these licenses for a wireless approach to interactive television, the nation's giant cable and telephone companies are planning to invest billions of dollars in upgrading their networks to bring two-way video capabilities to their copper-cable and fiber-optic networks. The financial clout and marketing muscle of the phone and cable companies will be a formidable force for small business executives like Ms. Moore.



Karin Anderson for The New Y

The Eon Corporation is one of the companies that has developed network technology for an interactive television system. At the company's headquarters in Reston, Va., Michael Sheward, manager of relations, passes by a satellite dish and other d that are used in the network.

Now, airwave investors are full of questions.

But Mr. Hundt, the F.C.C. chairman, contends that broadcasters may flock to the wireless interactive services, as a way to keep over-the-air television competitive with two-way cable.

It was privately held Eon, then doing business as TV Answer, that largely persuaded the F.C.C. in 1991 to allocate the radio frequencies for interactive television. At the time, the company had boasted of its success with an experimental system and attracted prominent political figures to its board — notably Mark Fowler, a former F.C.C. chairman, and George A. Keyworth, who served as President Reagan's science advisor. Mr. Fowler subsequently left the board.

TV Answer's technology turned out to be expensive and riddled with problems. And its founder, Fernando Morales, infuriated the F.C.C. in 1992 when he promoted the commission's plan to award licenses, running newspaper ads that touted the technology as "the biggest opportunity in your lifetime." Mr. Morales was forced out by his financial backers, and his successor, a former Kodak executive named David Lehman, retired one year later.

Eon's current president is R. Michael Sheridan, formerly director of the First Person multimedia division at the computer maker Sun Microsystems Inc. Mr. Sheridan said that he discovered upon arriving in December 1992 that Eon's original technology didn't work and had to be discarded.

Eon has spent more than $100 million building an central processing hub in Reston, where it plans to process network transactions and handle customer billing.

Eon plans not only to sell network systems to licensees; it also means to offer central processing services. And the company intends to operate a few networks of its own, having successfully bid on licenses for Santa Cruz, Calif.; Texas cities including Austin, Brownsville and Laredo; Charlottesville, Va., and Hagerstown, Md.

Slow Development Expected

But even Eon, as perhaps the leading proponent of the wireless interactive television, recognizes that programmers and advertisers might not rush to embrace the technology. As a result, the company is now trying to persuade the F.C.C. to allow it to also provide a mobile messaging service in competiton with paging and other wireless communications.

"To be frank, we think the interactive market will be slow to develop," Mr. Sheridan said. "We'd like to expand the network, since it is really ideally suited to other consumer mobile applications." It is nc whether the commission will

Eon's primary competitor to be Radio Telecom and Tecl which also wants to link local ers of interactive service to a ized transaction processing But Louis Martinez, presider vately held Radio Telecom, s his system would be much than Eon's and would cost as $150,000 to build in each city.

Concern Over Delays

For the licensees, the big is how soon either of these ogies will be available. Eo has demonstrated its tec says that it will have ec available in plenty of time fc holders, who will be obliged t least a rudimentary network within a year of receipt of censes. The F.C.C. expects handing over the licenses in six to nine months.

Radio Telecom, with wi Moore of Baton Rouge inte business, will not be ready t equipment until sometime n

James Hartley, head of a called Commercial Realty Inc., of St. Petersberg, Fla., winning bids totaling $35 n 20 licenses, said he was when he discovered after th that Eon's technology wa available. That is why Mr the auction's biggest win tioned the F.C.C. to delay ment deadline. When the fused to do so, he defaulted

"All I know is that it's go six to nine months before ment is ready," Mr. Ha "and that's enough for mc need to wait."

F.C.C. Expects Defaults by Many in Auction

The F.C.C. has set timetables for